

ARAC Seat Harmonization Working Group

Concept Paper – Task 1 – Test Article Selection Process

2.0 Definitions

These definitions are consistent within the context of this paper. It should be noted that these definitions should be checked for consistency with other guidance material.

A Family of Seats - a group of seat assemblies regardless of the number of seat places, built from equivalent components in the primary load path.

Rational Analysis - An analysis based on good engineering principles, judgement, and/or accepted methodology. This can include, but is not limited to, static/dynamic load comparison, static strength analysis, comparative static/dynamic strength analysis, engineering judgement linear static and non-linear finite analysis, and inspection.

Equivalent - Demonstrated to be comparable via analysis/testing for all aspects of intended function, performance, and related criteria.

Energy Absorbing Device - Load rate or peak load sensitive mechanism.

Primary Load Path - The components within the seat that carry the load from the point of load application to the structure that reacts the load from the seat system or sub-system.

Structural - from seat belt to fittings attaching seat system to airplane structure.

Lumbar - from bottom cushion to fittings attaching seat system to airplane structure.

HIC - from point of ATD head contact to seat back attachments.

Head Path - same as structural.

Similar Design Philosophy - A design which uses the same:

- Method of Construction (e.g., machined part vs. built up part),
- Detail part materials (alloys, heat treat, etc.)
- Manufacturing processes (machined, cast, etc.),
- Geometry, including section properties, except for minor differences resulting from space limitations within the seat or aircraft interface,
- Attachment method except for minor differences resulting from space limitations within the seat
- Load path

Typically, minor differences to geometry and attachment method must be shown to be equivalent to or less critical than the “baseline design” with regard to strength, stiffness, and seat permanent deformation.

Energy Absorber Rating - The amount of load required before the energy absorbing device initiates. The “highest rated” energy absorbing device would be the device that requires the highest load to initiate.

ARAC Seat Harmonization Working Group
Concept Paper – Task 1 – Test Article Selection Process

Beams - Lateral Beams - Cross Tubes - The lateral structural members that carry load across the seat frame from spreaders to seat legs.

Energy Absorber “Bottom-Out” - The energy absorber “bottoms out” when it reaches its maximum stroke and no longer provides an energy absorption function.

Occupant Position - This is assessed using the Seat Reference Point (SRP) as defined in AS8049 Revision A. Variations in SRP dimensions are in the component X, Y and Z directions. The resultant change is not considered.

Instability Failure - An instantaneous loss of the load carrying capability of a structural member (e.g., the collapse of a column).